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I. Problems

A problem has arisen concerning the DNR personnel assigned to the LANDSAT Program. The clerical technician who was working with the program has quit, which handicaps the work being done on the "in house" projects. Hopefully a replacement can be found within the next two weeks.

II. Accomplishments and Significant Results

The LANDSAT Program has two main categories for the projects which will be done during this contract.

The first category involves the primary projects which will basically be done by the Earth Satellite Corporation. The satellite imagery will be used more with these, because of the expertise required to interpret the details necessary to make the projects' information useful.

The secondary category has all the projects that the Department of Natural Resources will do or sponsor to be done by graduate students or other agencies. These projects represent the start of the Departments' objective to develop a team of remote sensing technicians who will work on "interpretive" projects for the different divisions of the DNR. At the present time the DNR is cooperating or sponsoring three graduate students to do research for Masters Degrees, using remote sensing techniques as an inventory tool. Most of the projects concern forest vegetation cover type studies of State parks and forests.

A. Primary Projects

1. A Satellite Image Mosaic of West Virginia

This project has been finished in accordance with the specifications outlined in previous progress reports.

The next phase of this project involves DNR utilization of the mosaic, and the organization of proposals to other agencies concerning ways in which the mosaic can be used. This phase will start immediately.

2. The Wetlands Classification Project

The Wetlands Classification Project, which has been finished, will provide information concerning the location of wetlands that can be identified on the high altitude CiR aircraft photography taken on December 3, 1973. A field trip was taken to verify some of the interpreted information and a written report has been prepared discussing the results and the utility of this type of remote sensing technique to the DNR. Additional information concerning this project will be represented in the final report.

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3. The Forest Vegetation Cover Type Project

This project, which has been finished, involves the area of Canaan Valley in Tucker County, West Virginia. Vegetation interpretations have been made on Diazo printed bulk processed satellite imagery, taken September 5, 1973, at a scale of 1:27,000. The two types of information obtained include an interpretation of the area using only the satellite imagery, and a comparative study between satellite and high altitude aircraft CIR photography.

4. The Canaan Valley - Dolly Sods Project

The interpretation of the high altitude CIR aircraft photography has been finished as outlined in previous Progress Reports. The final objective of using the information in the naturalists' programs at Blackwater Falls and Canaan Valley State Parks can now be accomplished.

5. Strip Mine Inventory Project

This project has not been finished. The photobase map, low altitude stereo CIR photography, and computer enhanced satellite image product have been completed and are ready to be compared and interpreted. A DNR representative will finish this project as soon as possible.

6. Water Impoundment Project

This project has been cancelled due to insufficient funds.

7. The Remote Sensing Workshop Handbook

The handbook is now in a rough draft form containing most of the information which has been described in previous Progress Reports. After the rough draft version of the handbook has been reviewed by the Remote Sensing Workshop Committee, it can be sent to the printer. The completion date for this project has been set for February 28, 1977.

8. The Ecological Interpretation Project

The only thing that will be done with this project is to provide technical assistance to the U.S. Fish and Wildlife Agency who is working on the water impoundment inventory projects.

B. Secondary Projects

1. Watoga State Park

Most of the desired information concerning Watoga State Park has been obtained from the aerial photographs. The photobase maps and overlays can be finished after the completion of the vegetation cover type study. This project should be completed sometime in March or April of 1977.

2. The Parks and Forest Inventory Projects

Most of the other State park and forest vegetation inventories have been completed. The parks that were inventoried included: Holly River, Pipestem, Lost River, and Blennerhassett Island. Along with Greenbrier and Kanawha State Forest. Some of these park and forest inventories will be expanded upon to include U-2 photography overlay maps, and satellite imagery.

3. Cooperation with The West Virginia Nature Conservancy Project

The Nature Conservancy Project is inventorying unique ecological areas in West Virginia. The results from this study will be organized into a computerized resource data base.

The classification system that the Conservancy is using has been reviewed and considered for use with the LANDSAT Program results. Modifications will have to be made, but the LANDSAT resources data will be computerized so that agencies in the State will be able to use it more effectively.

The primary reason for not setting up a classification system at this phase of the LANDSAT Program has been because the research projects have not developed to the point of demonstrating the variety of information which will be received as results of the projects.

4. Overlay Maps

The Department of Natural Resources is currently doing overlay maps on satellite color composite bulk processed, and Optronics images at 1:500,000 and 1:250,000 of the Eastern Central Mountainous and South Eastern sections of the State. These overlays will contain information such as: county boundaries, major cities, major water bodies, unique cover type zones. The county boundaries overlay is the only one that is completed. When these products are finished they will serve as valuable teaching aids.

5. Public Relations Projects

The LANDSAT Program should receive quite a bit of additional publicity in the near future. The products from the primary projects are finished

and hopefully an article in the "Wonderful West Virginia" Magazine will be written. Also the amount of requests for speaking engagements has increased.

6. Slide Programs

The Department of Natural Resources is currently organizing two slide-video cassette tape programs which will be available in the Department of Natural Resources Library for use by DNR personnel and other State agencies.

- a. Infrared Photography - (20-30 minutes - 50% completed) This slide program will explain the principles, techniques, and applications of infrared photography. The program should be completed by December, 1976.
- b. The West Virginia LANDSAT Program - (20-30 Minutes - 65% completed) This presentation will explain the objectives of the West Virginia Program and give basic information on some of the work being done in other areas of the country.

7. Color Infrared High Altitude Photography Coverage of the State

CIR photography taken in December, 1973, has been received by the DNR. This imagery, which is available to other agencies, will provide coverage for most of the State on 1:120,000 scale. Some of the 9" X 9" transparencies and 35mm sectional slides of the U-2 frames are being used for vegetation studies. An increasing number of agencies are using this photography.

8. A Forest Fire Burned Site Project

A project proposal is being written to inventory forest fire burned sites in the southwestern part of the State. It is predicted that burned sites can be detected on satellite imagery by using computer classification techniques. Topographical maps and satellite images have been ordered for the target area to be studied. If this project can be proven to be successful and can be implemented into the Forestry Division of the DNR as a system to monitor burned sites, it can be very beneficial.

9. Potential Secondary Projects for the Near Future

- a. An Inventory of Cooper's Rock State Forest
- b. A Turkey Habitat Study
- c. Using Aerial Photography and Satellite Imagery for Displays of Information Presented by the West Virginia Department of Commerce.

III. Publications

No publications have been made at this time.